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PENNSYLVANIA
TRAIL OF GEOLOGY

ICE MINE AND BALANCED ROCK

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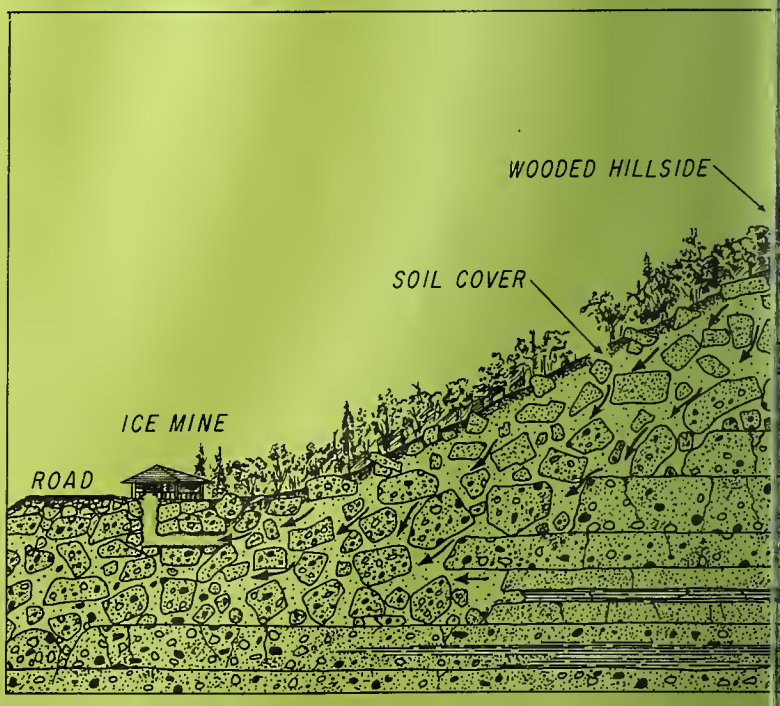
ICE MINE

The Trough Creek Ice Mine is not a real mine but is a short opening into the hillside. Dug, perhaps, as a prospect hole in the early days of mining, it now serves as an air duct for the release of cold air trapped during the winter in the rock mass above.

As shown in the sketch on page 3, frost action and weathering along the hillside have broken the ledges into a mass of loose slabs and blocks now partly overgrown by trees. Cold weather during the winter cools the rock mass, and the voids between the blocks are filled with cold air.

Winter air flowing into the mine opening is dry, and therefore only a little ice forms. However, in the springtime, outside air begins to warm, the air circulation at the opening changes, and dense cold air flows downhill out of the rock mass. Melting snow water enters the mine opening and freezes as it meets the flow of cold air.

As summer approaches, warm moist air also freezes at the opening and it contributes to the buildup of ice at the mine mouth. This freezing continues well into summer until the flow of cold air from the rock mass ceases due to warming and downhill circulation stops.

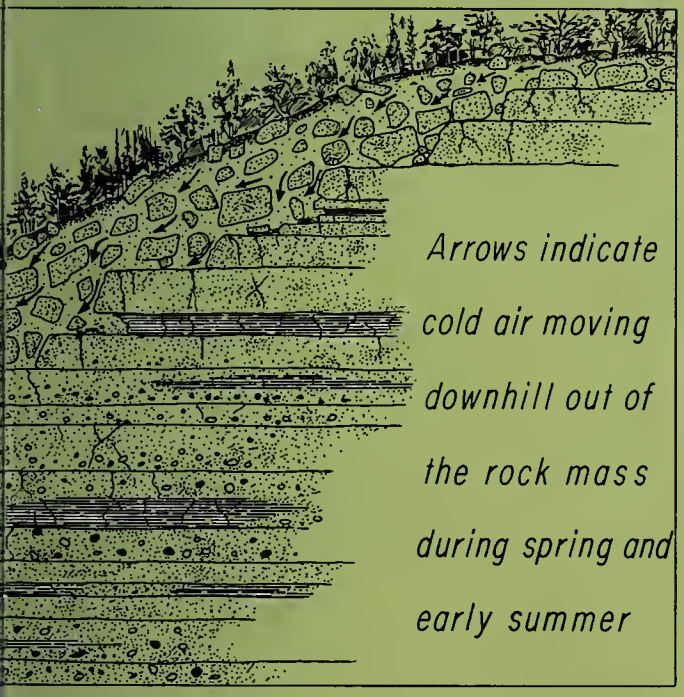


Cutaway view of hillsid

BALANCED ROCK

A second geologic feature of interest at the park is a balanced rock high on the ridge along the west side of Trough Creek valley. The rock gives the impression of being precariously balanced on the edge of a cliff, about to plunge into the valley below. It has stood, however, for many years.

This rock is called an "erosion remnant" and was left behind with other blocks when Trough Creek began to cut its valley millions of years ago. The sandstone block has not moved far from



above ice mine.

its original position. It was broken from rock cliffs that are now gone, but once formed a higher part of the ridge on which the balanced rock rests. The rock broke from these cliffs and through the years moved slowly downhill as other blocks below it weathered away. It finally came to rest at the edge of the cliff.

Trough Creek meanders back and forth in the valley bottom, undercutting newly formed cliffs above it. This process can be seen at work today a few hundred yards upstream at Copperas Rock where narrow ledges jut out over the water. A similar process of undercutting and sliding caused the balanced rock to be left, apparently suspended, at the cliff's edge. The sketch on page 7 shows how this process works.

GENERAL GEOLOGY

Trough Creek State Park is near the center of a mountainous area of Pennsylvania called the Valley and Ridge province of the Appalachian Mountains. Long, narrow, steep-sided ridges extend from northeast to southwest throughout this mountainous section. These have been carved and etched by rivers and streams which flow along the valleys, cutting through the ridges in some places to form water gaps. The mountains are "fold mountains" and result from intense forces within the earth that worked upon all of the rock layers for many millions of years, squeezing the layers into wrinkles which extend across the center of the State. The ridges we see today are only the remains of older mountains which were eroded away by action of the weather and running water.

Each downfold of rock layers is a syncline and each upfold is an anticline. Trough Creek State Park is in the bottom of a syncline. The rock layers we see along the creek in the center section of the fold are almost horizontal and are not tilted as in neighboring areas along Terrace Mountain and Sideling Hill.

The rock layers are sandstone and conglomerate which are hard and resistant to running water. Water running along the surface carrying gravel and sand would take a long time to wear away the rock if the rock material had not been previously broken along cracks and fissures as a result of the same forces which made the mountains. With that advantage, water flows into the narrow fractures and breaks off blocks near

This general sketch of rock weathering at Copperas Rock shows geologic processes at work today that are similar to the ones that helped form Balanced Rock many years ago.

the surface by repeated freezing and thawing. As these loose blocks accumulate, they move slowly downhill due to gravity.

The creek is deepening its valley today, making new ledges to be subjected to block weathering.

John P. Wilshusen
Geologist

Visiting Hours

SUMMER SEASON

8:00 A.M. to 9:00 P.M.

OTHER TIMES

8:00 A.M. to sundown

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